## LISTING OF THE CLAIMS

No claims are cancelled, amended or added by this paper. The following is listing of claims pending in this application.

1. **(Original)** An optical transmitter comprising:

a modulated source for generating a modulated optical signal; and

a vertical lasing semiconductor optical amplifier (VLSOA) coupled to the modulated source for amplifying the modulated optical signal, the VLSOA comprising:

a semiconductor active region;

an amplifying path traversing the semiconductor active region; and

a laser cavity including the semiconductor active region, wherein the laser cavity is oriented vertically with respect to the amplifying path and pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value.

2. **(Original)** The optical transmitter of claim 1 wherein the modulated source and the VLSOA are implemented as discrete devices.

3. **(Original)** The optical transmitter of claim 2 further comprising:

an optical fiber coupling the modulated source to the VLSOA.

4. **(Original)** The optical transmitter of claim 2 further comprising:

free space optics coupling the modulated source to the VLSOA.

5. **(Original)** The optical transmitter of claim 1 wherein the modulated source comprises:

a laser source; and

a modulator coupled to the laser source.

6. **(Original)** The optical transmitter of claim 5 wherein the laser source and the modulator together include an electro-absorption modulated laser (EML).

7. **(Original)** The optical transmitter of claim 5 wherein:

the laser source and the modulator together include a wavelength-tunable laser integrated with an electro-absorption modulator; and

the VLSOA is implemented as a discrete device.

8. **(Original)** The optical transmitter of claim 5 wherein:

the laser source includes a wavelength-tunable laser;

the modulator includes an electro-absorption modulator; and

the wavelength-tunable laser, the electro-absorption modulator and the VLSOA are integrated on a common substrate.

9. **(Original)** The optical transmitter of claim 5 further comprising:

a semiconductor optical amplifier coupled between the laser source and the modulator.

10. **(Original)** The optical transmitter of claim 5 wherein the laser source is selected from a group consisting of a DBR laser and a DFB laser.

11. **(Original)** The optical transmitter of claim 5 wherein the modulator includes an electro-absorption modulator.

12. **(Original)** The optical transmitter of claim 5 wherein the modulator includes a lithium niobate modulator.

13. **(Original)** The optical transmitter of claim 5 wherein:

the laser source comprises an active region;

the modulator comprises an active region;

the laser source, the modulator and the VLSOA are integrated on a common substrate;

the active region of the laser source transitions into the active region of the modulator; and

the active region of the modulator transitions into the semiconductor active region of the VLSOA.

14. **(Original)** The optical transmitter of claim 5 wherein:

the laser source comprises an active region;

the modulator comprises an active region; and

the laser source, the modulator and the VLSOA are integrated on a common substrate; the semiconductor active region of the VLSOA and the active regions of the laser source and the modulator are based on a common structure which has been altered so that the semiconductor active region of the modulator has a different transition energy than the active region of the laser source and the active region of the VLSOA.

15. **(Original)** The optical transmitter of claim 5 wherein the laser source, the modulator and the VLSOA are integrated on an InP substrate.

16. **(Original)** The optical transmitter of claim 1 further comprising:

at least one additional modulated source, wherein each modulated source generates a modulated optical signal at a different wavelength; and an optical coupler coupling the modulated sources to the VLSOA.

17. **(Original)** The optical transmitter of claim 16 wherein each modulated source comprises: a laser source integrated with a modulator.

18. **(Original)** The optical transmitter of claim 16 wherein the modulated sources, the optical coupler and the VLSOA are integrated onto a common substrate.

19. **(Original)** The optical transmitter of claim 16 wherein the optical coupler comprises a wavelength division multiplexer.

20. **(Original)** The optical transmitter of claim 16 further comprising:

a plurality of optical amplifiers, at least one optical amplifier coupled between each modulated source and the optical coupler for amplifying the modulated optical signal generated by the modulated source.

21. **(Original)** The optical transmitter of claim 1 further comprising:

at least one additional modulated source; and

an optical coupler coupling the modulated sources to the VLSOA.

22. **(Original)** The optical transmitter of claim 1 wherein the modulated source comprises an internally modulated laser source.

23. **(Original)** The optical transmitter of claim 22 wherein the internally modulated laser source is integrated with the VLSOA on a common substrate.

24. **(Original)** The optical transmitter of claim 22 wherein the internally modulated laser source includes a vertical cavity laser.

25. **(Original)** The optical transmitter of claim 1 wherein the modulated optical signal lies in a wavelength region located between 1.3 micron and 1.7 micron.

26. **(Original)** The optical transmitter of claim 1 wherein the modulated optical signal includes at least two channels located at different wavelengths.

27. **(Original)** The optical transmitter of claim 1 wherein the modulated optical signal is modulated at a data rate of at least 1 Gbps.

28. **(Original)** The optical transmitter of claim 1 wherein the substantially constant value is adjustable.

29. **(Original)** An optical modulator comprising:

an external modulator; and

a vertical lasing semiconductor optical amplifier (VLSOA) coupled to the external modulator, the VLSOA comprising:

a semiconductor active region;

an amplifying path traversing the semiconductor active region; and

a laser cavity including the semiconductor active region, wherein the laser cavity is oriented vertically with respect to the amplifying path and pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value.

30. **(Original)** The optical modulator of claim 29 wherein the external modulator and the VLSOA are integrated onto a common substrate.

31. **(Original)** The optical modulator of claim 30 wherein the external modulator includes an electro- absorption modulator.

32. **(Original)** The optical modulator of claim 30 wherein:

the external modulator comprises an active region; and

the active region of the external modulator transitions into the semiconductor active region of the VLSOA.

33. **(Original)** The optical modulator of claim 30 wherein:

the external modulator comprises an active region; and

the semiconductor active region of the VLSOA and the active region of the external modulator are based on a common structure which has been altered so that the semiconductor active region of the VLSOA has a different transition energy than the active region of the external modulator.

34. **(Original)** An optical source comprising:

a laser source; and

a vertical lasing semiconductor optical amplifier (VLSOA) coupled to the laser source, the VLSOA comprising:

a semiconductor active region;

an amplifying path traversing the semiconductor active region; and

a laser cavity including the semiconductor active region, wherein the laser cavity is oriented vertically with respect to the amplifying path and pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value.

35. **(Original)** The optical source of claim 34 wherein the laser source and the VLSOA are integrated onto a common substrate.

36. **(Original)** The optical source of claim 35 wherein the laser source is selected from a group consisting of a DBR laser and a DFB laser.

37. **(Original)** The optical source of claim 35 wherein:

the laser source comprises an active region; and

the active region of the laser source transitions into the active region of the VLSOA.

38. **(Original)** The optical source of claim 35 wherein:

the laser source comprises an active region; and

the semiconductor active region of the VLSOA and the active region of the laser source are based on a common structure.

39. **(Original)** The optical source of claim 35 wherein the common substrate is an InP substrate.

40. **(Original)** The optical source of claim 34 wherein the laser source includes a multi-wavelength source.

41. **(Original)** The optical source of claim 34 wherein the laser source includes a tunable-wavelength laser source.

42. **(Original)** A high power, high speed optical transmitter comprising:

a laser source for generating an optical carrier;

a modulator coupled to the laser source for modulating data onto the optical carrier at a data rate of at least 1 Gbps; and

a linear, semiconductor optical amplifier coupled to the modulator capable of amplifying the modulated optical carrier to a power of at least 1 m W.

43. **(Original)** The optical transmitter of claim 42 wherein the linear, semiconductor optical amplifier comprises a VLSOA.

44. **(Original)** The optical transmitter of claim 42 wherein the laser source and the modulator together include an electro-absorption modulated laser (EML).

45. **(Original)** The optical transmitter of claim 42 wherein the laser source, the modulator and the semiconductor optical amplifier are integrated on a common substrate.